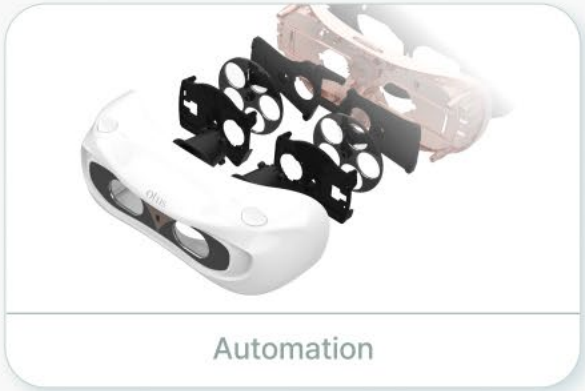
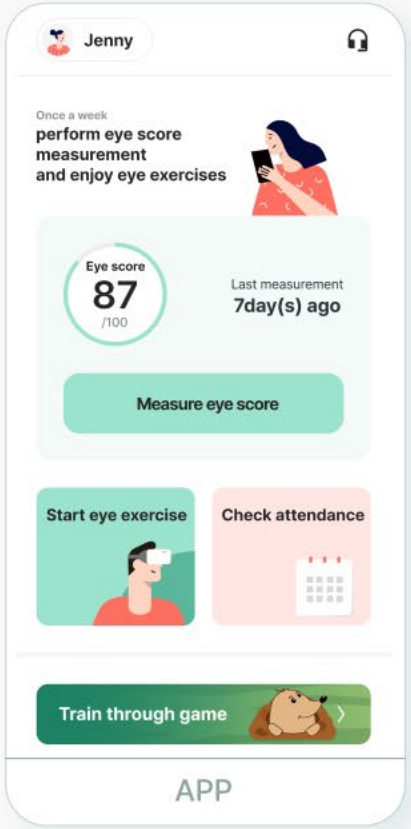
What is OTUS?

- OTUS is an **automatic training device** developed **based on Flipper training,** one of accommodation training
- Provides **automated measurement** and **training** through a dedicated **app**
- With an open view, the **user can look at any object they want**(Youtube, Book.. ect)

Flipper Training



Automation



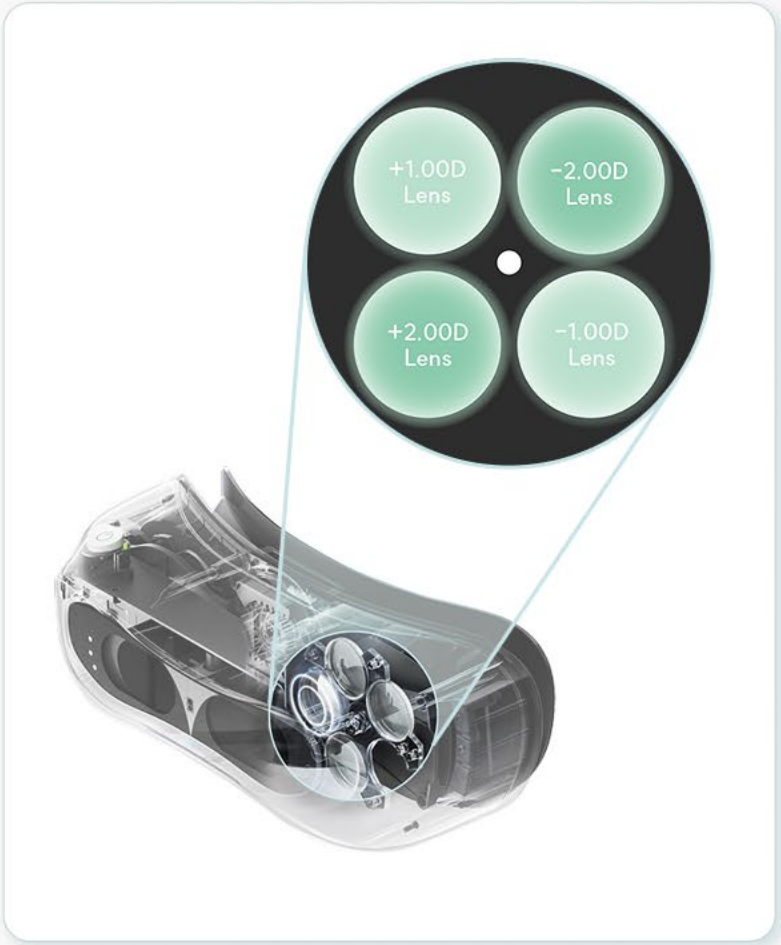
APP

OTUS

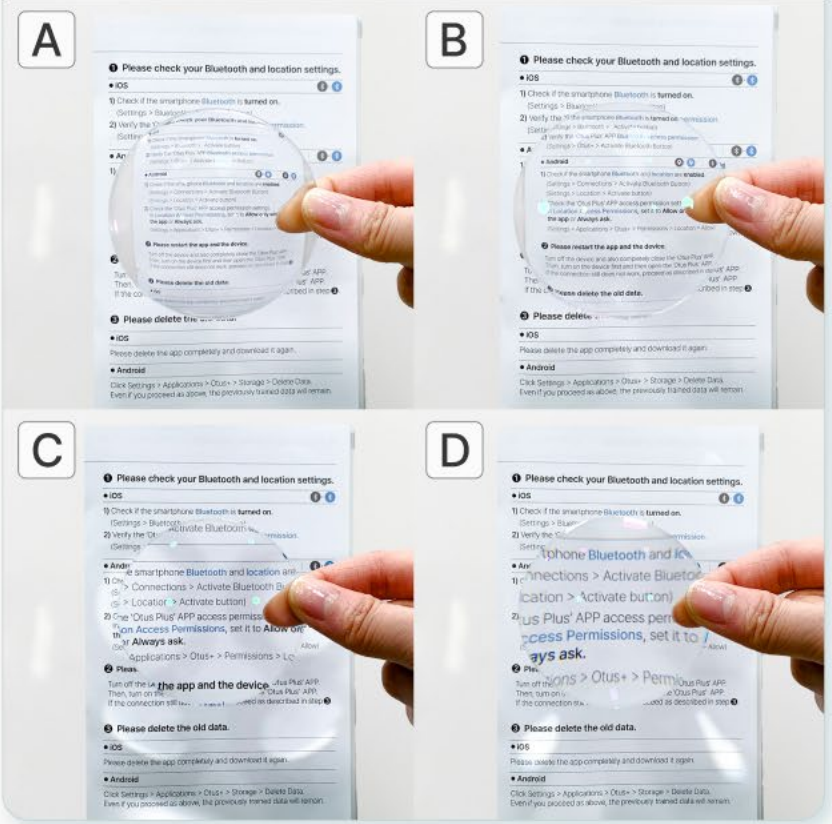
High Adherence

OTUS: Personalized Vision Training for individuals

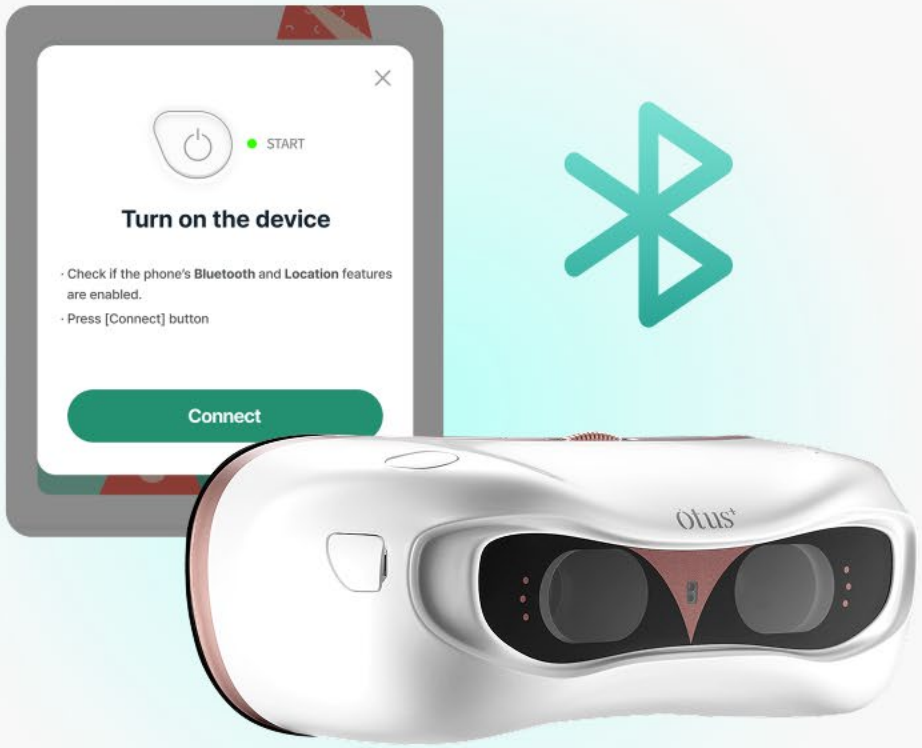
With a total of **8 patented lenses**, OTUS provides customizable training tailored to each individual's vision needs.



The device utilizes four lenses per eye, resulting in a total of **eight lenses** when both sides are in use.



OTUS Operating Principle_Preparation Before Measurement



Bluetooth Pairing Between Otus App and Device.

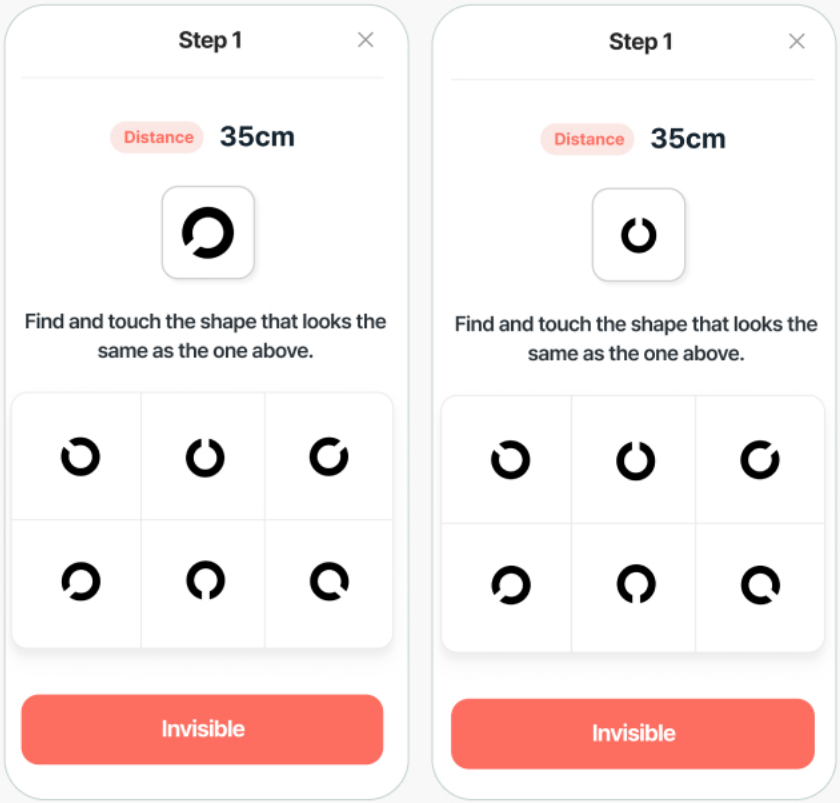
Glass

Lens Insert

Wear the Device with
Prescription Glasses or a Prescription Lens Insert.

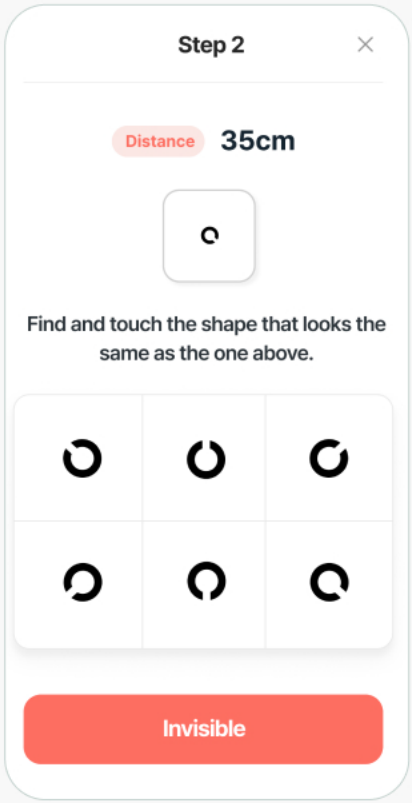
OTUS Operating Principle_ Measurement

Step1. Best Corrected Visual Acuity Test



The device's lenses are set to +2.00D while finding Best Corrected Visual Acuity.
If successful, the size of the Landolt C will gradually decrease.

Step2. Diopter Adjustment

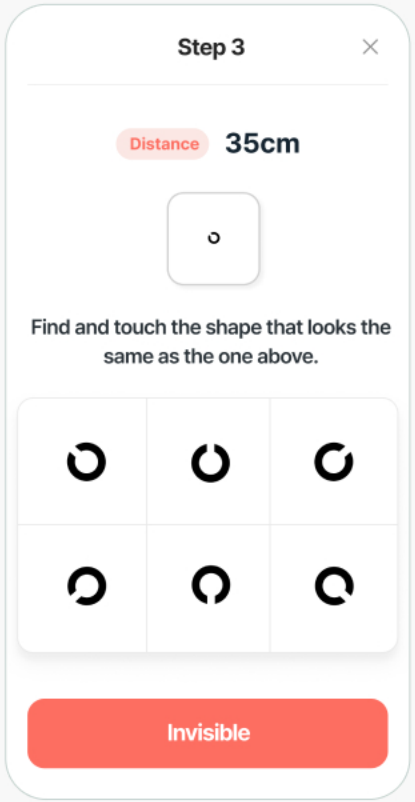


The device's diopter is adjusted based on the measured vision to find the maximum accommodation.

The lenses are gradually applied in the order of +2.00D, +1.00D, 0.00D, -1.00D, and -2.00D.

OTUS Operating Principle_ Measurement

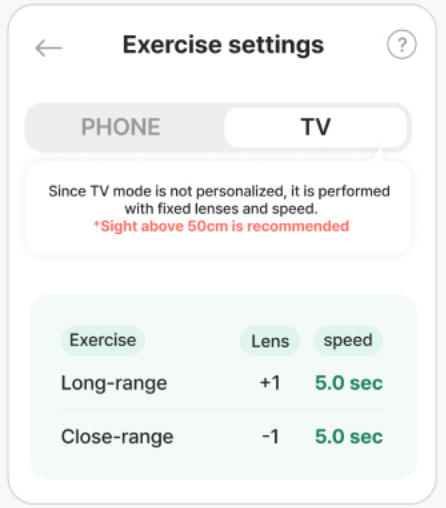
Step3. Best Corrected Visual Acuity Test



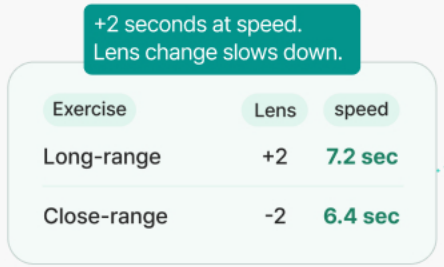
Each time the Landolt C is correctly identified, two measured diopters are applied, and the focusing response speed is recorded.

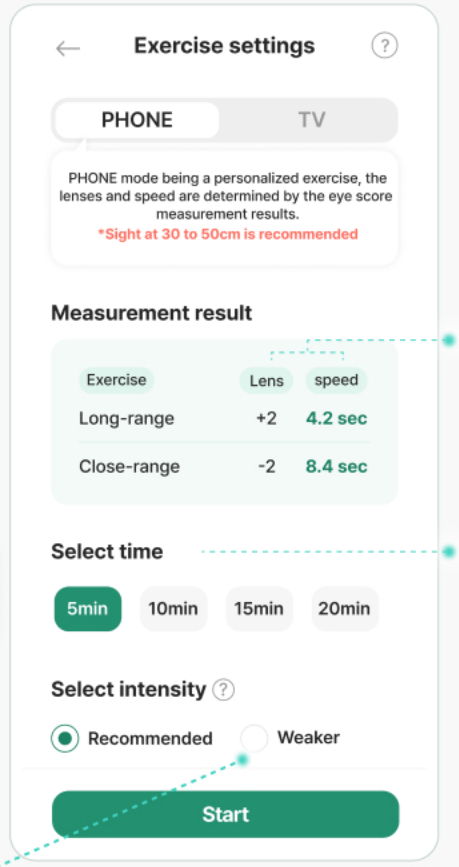
Accommodative facility is measured for one minute using the measured visual acuity and diopters.

Step4. Training Setup and Start



TV mode is not personalized; the same settings apply to all users.





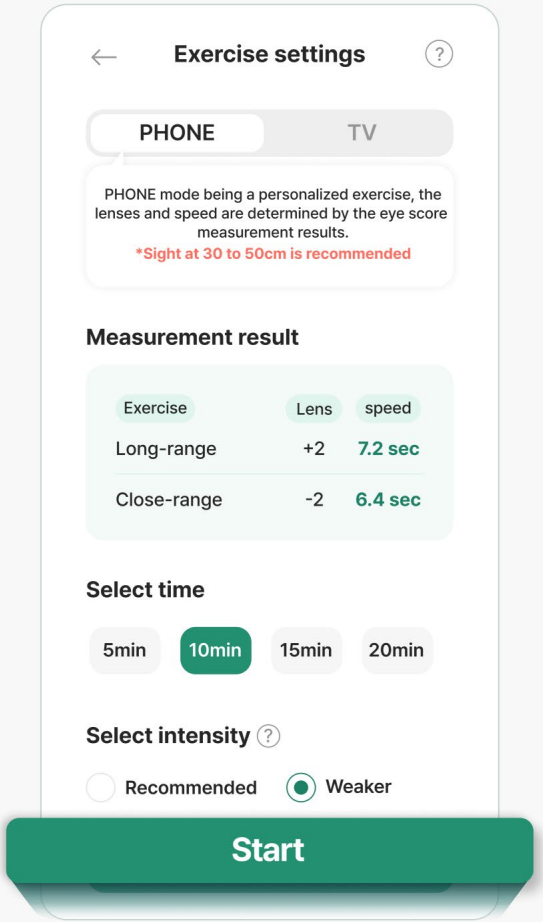
Speed is +1 second of actual focusing response speed

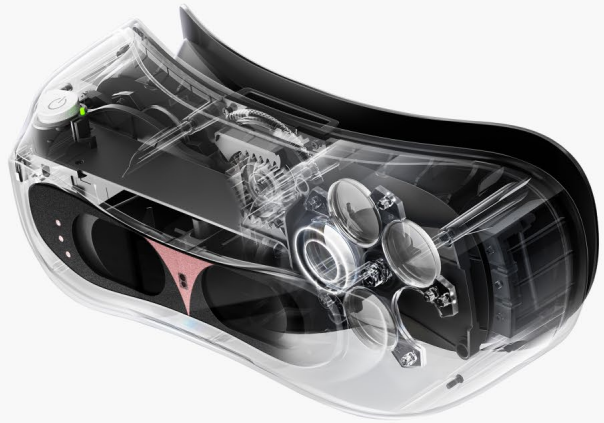
Set training time

Phone mode is personalized.

OTUS Operating Principle_ Measurement

Step5. Start Training



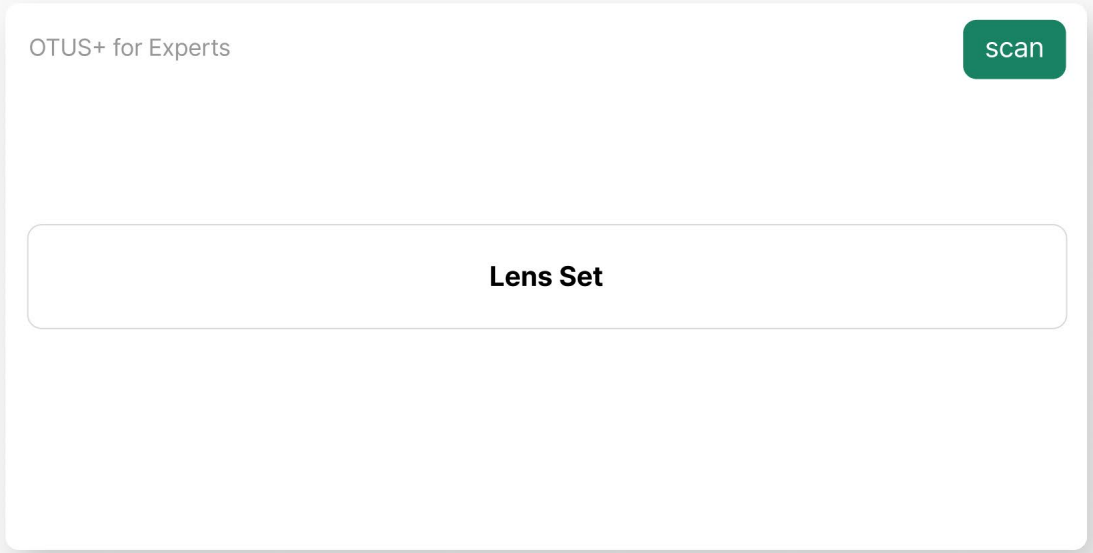


The training setup information is transmitted to the device, and the training begins.

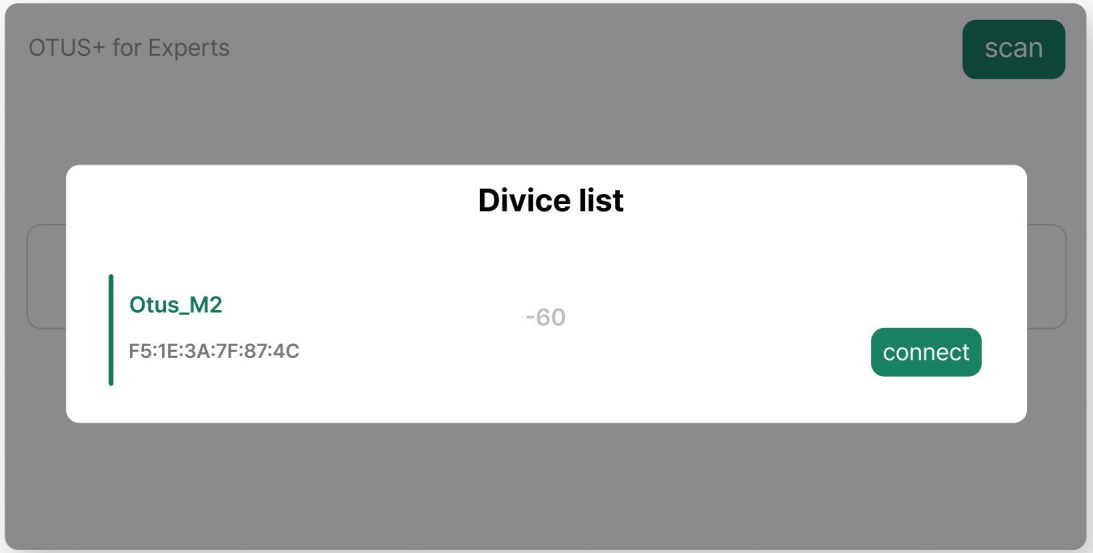
Train by looking at something you want.

App for Experts

Function. Experts can set the lens diopter and change speed.



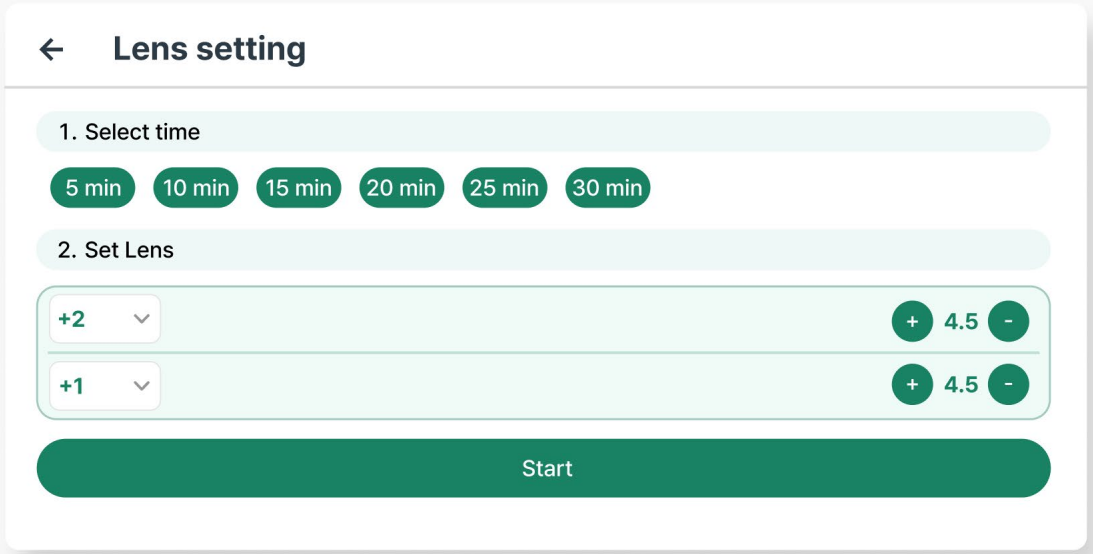
First, bluetooth pairing between App and Device.

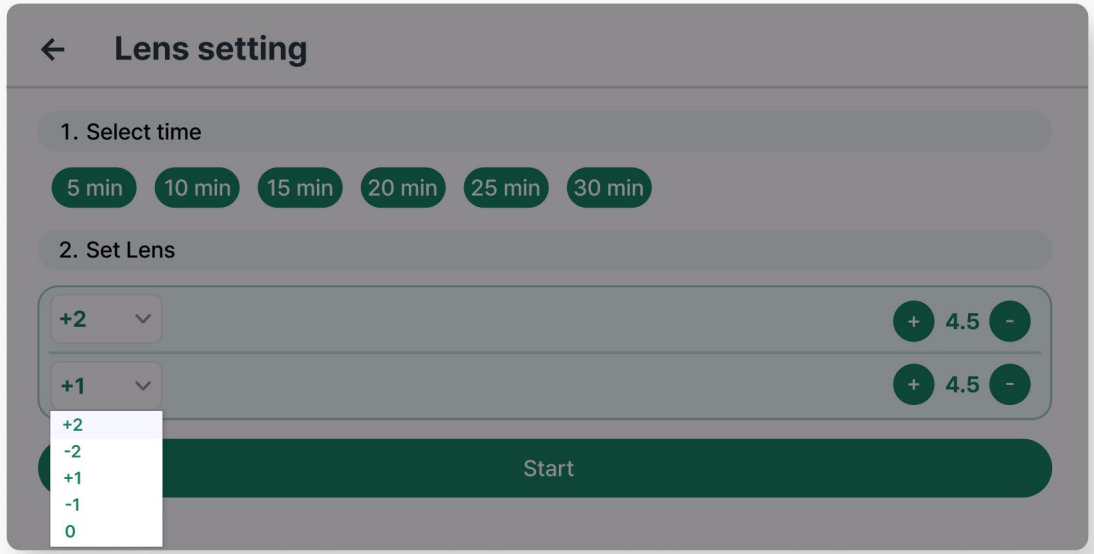


When multiple devices are on,
the closer the device is to the app, the closer the number is to zero.

App for Experts

Function. Experts can set the lens diopter and change speed.





Expert apps can be useful for office training.

Advantages & Disadvantages of the OTUS Device

	Anticipated Effects	
Features	Advantages	Disadvantages
Automated measurement and training	• Easily usable by non-experts • Adaptation of training routines based on changes in accommodatve function.	-
Home training	• Reducing the inconvenience of visiting the center	-
Watching preferred content, such as YouTube videos or books	• Enhancing attentional focus to improve adherence	• May provide less precise accommodative stimulation.
The diopter steps are large	-	• May provide less precise accommodative stimulation.

Clinical Case Study Conducted at OTUS Vision Research Center

- At the OTUS Vision Research Center in Seoul, South Korea,
  we utilize OTUS to provide 100% home training care for patients with binocular vision disorders.
- In this report, we aim to share clinical case studies based on our experiences using OTUS at our research center.

Clinical Case Study Conducted at OTUS Vision Research Center

Case 1 43 years-old, Early Presbyopia, NITM(Nearwork-Induced Transient Myopia)

	Before	After(1,3month)	
Patient Assessment	• Underwent LASEK three years ago, Experiences prolonged blurriness when shifting focus to distant objects after near work. The longer the near work continues, the more the vision progressively blurs.	• NITM (Nearwork-Induced Transient Myopia) has significantly improved, and the blurriness during near work has been greatly reduced, allowing for longer working hours.	
Old Glasses	-	-	
Examination Results	First Visit	After one month	After three month
	• OD : S -0.75D C -0.50D 180 VA 20/20 • OS : S -0.75D C -0.75D 180 VA 20/20 • PRA(40cm) OU : -0.25D / OD : -0.25D / OS : -0.25D • NRA(40cm) OU: +1.25D / OD : +1.25D / OS : +1.25D • Accommodative facility: OU : 5cpm / OD : 6cpm / OS : 6cpm *(+)Dioperchanges more slowly * No other binocular vision disorders	• OD : S -0.50D C -0.50D 180 VA 20/20 • OS : S -0.50D C -0.75D 180 VA 20/20 • PRA(40cm) OU : -0.25D / OD : -0.25D / OS : -0.25D • NRA(40cm) OU: +2.00D / OD : +2.00D / OS : +2.00D • Accommodative facility : OU : 11cpm / OD : 11cpm / OS : 11cpm	• OD : S -0.50D C -0.50D 180 VA 20/20 • OS : S -0.50D C -0.75D 180 VA 20/20 • PRA(40cm) OU : -0.75D / OD : -0.75D / OS : -0.75D • NRA(40cm) OU: +2.00D / OD : +2.00D / OS : +2.00D • Accommodative facility : OU : 14cpm / OD : 14cpm / OS : 14cpm
Case Analysis	• She did not exhibit any binocular vision disorders such as ocular deviation. Her recent complaints of NITM (Nearwork-Induced Transient Myopia) suggest that the progression of presbyopia has led to a decline in accommodative function.	• She stated that she did not feel any discomfort or boredom during training, as she was able to watch her favorite YouTube videos while using the device	
Management	• The patient was instructed to use OTUS five days a week for 10 to 20 minutes per session. To enhance the training effect, prescription lens clips were provided as well.	• As accommodative function normalized and the patient expressed satisfaction, continued use was recommended at a frequency of three to five days per week. Regular use is expected to help maintain accommodative function and delay the progression of presbyopia.	

Clinical Case Study Conducted at OTUS Vision Research Center

Case 2 20 years-old, CI(Convergence Insufficiency), Accommodative lead, Learning Disorder

	Before	After(1,3month)	
Patient Assessment	• Studies for 12 hours a day. For the past 2–3 months, intermittent blurriness of text has occurred depending on condition, making it difficult to sustain studying. Over the past month, eye pain and headaches have developed, along with difficulty keeping track of lines while reading. In severe cases, it becomes difficult to sustain studying for more than an hour, depending on the condition.	• During the first month, discomfort symptoms would appear after studying for approximately 3–6 hours per day. Now, after three months of training, symptoms occur after 6–9 hours of study. Although studying for 12 hours, as before, is still difficult, the patient is satisfied with the significant improvement in discomfort.	
Old Glasses	-	-	
Examination Results	**First Visit**	**After one month**	**After three month**
	• OD : S +0.25D C -0.50D 180 VA 20/20 • OS : S +0.25D C -0.75D 180 VA 20/20 • Cover test(Distance/near) : 0/2 exo • Base-out vergence(Distance/near) : (-/2/1) / (2/8/4) • Gradient AC/A ratio: 2:1 • PRA(40cm) OU : -0.20D / OD : -0.20D / OS : -0.20D • NRA(40cm) OU: +1.00D / OD : +1.25D / OS : +1.25D • FCC(40cm) : -1.00D(Accommodative lead) • Accommodative facility: OU : 5cpm / OD : 6cpm / OS : 6cpm *(+)Dioperchanges more slowly	• OD : S +0.25D C -0.50D 180 VA 20/20 • OS : S +0.25D C -0.50D 180 VA 20/20 • Cover test(Distance/near) : 0/0 exo • Base-out vergence(Distance/near) : (4/10/4) / (6/12/8) • Gradient AC/A ratio: 3:1 • PRA(40cm) OU : -2.50D / OD : -2.50D / OS : -2.50D • NRA(40cm) OU: +2.25D / OD : +2.25D / OS : +2.25D • FCC(40cm) : -0.00D • Accommodative facility : OU : 12cpm / OD : 14cpm / OS : 14cpm	• OD : S +0.25D C -0.50D 180 VA 20/20 • OS : S +0.25D C -0.50D 180 VA 20/20 • Cover test(Distance/near) : 0/0 exo • Base-out vergence(Distance/near) : (14/22/16) / (28/34/26) • Gradient AC/A ratio: 3:1 • PRA(40cm) OU : -3.00D / OD : -3.00D / OS : -3.00D • NRA(40cm) OU: +2.25D / OD : +2.25D / OS : +2.25D • FCC(40cm) : -0.00D • Accommodative facility : OU : 13cpm / OD : 14cpm / OS : 14cpm
Case Analysis	• Excessively long hours of studying each day, combined with convergence insufficiency, induce excessive use of accommodative convergence, leading to accommodative lead. This manifests as symptoms such as blurriness, eye pain, headaches, and learning difficulties.	• Studying for 12 consecutive hours is still challenging, but this is a demanding task even for individuals with normal visual function. It has been confirmed that the patient's visual function is sufficient for daily activities. Additionally, using OTUS was easy and enjoyable while watching YouTube, but the patient found the tranaglyph exercises tedious and occasionally did not complete the full training routine as prescribed.	
Management	• OTUS training was prescribed for 10–15 minutes per day, five days a week. Additionally, convergence exercises using a tranaglyphwere instructed to be performed five days a week.	• The same training regimen will be continued while monitoring progress. To alleviate accommodative fatigue during near work, +0.75Dnear-vision glasses were prescribed.	

Clinical Case Study Conducted at OTUS Vision Research Center

Case 3 8 years-old, Intermittent Exotropia(IXT), Accommodative lag

	Before	After(1,3month)
Patient Assessment	• Ocular deviation occurs 8–10 times per day. Typically, the patient dozes off briefly, but if they do not, each episode lasts around 15–30 minutes. Additionally, 2–3 times per day, the deviation persists for up to an hour.	• When the primary observer, the patient's mother, observed the patient, ocular deviation occurred 2–3 times per day, with each episode lasting 15–30 minutes. The secondary observer, the patient's father, rarely observed any ocular deviation.
Old Glasses	• OD : S -1.25DVA 20/32 • OS : S -1.00DVA 20/32 • ADD +0.75D(Progressive lenses)	• OD : S -1.75D C -0.50D 180 VA 20/20 • OS : S -1.25D C -0.50D 180 VA 20/20
Examination Results	First Visit	After one month
	• OD : S -1.75D C -0.50D 180 VA 20/20 • OS : S -1.25D C -0.50D 180 VA 20/20 • Cover test(Distance/near) : 18/30 exo • Base-out vergence(Distance/near) : (-/4/1) / (0/6/2) • Gradient AC/A ratio: 2:1 • NRA(40cm) OU: +1.50D / OD : +1.75D / OS : +1.75D • FCC(40cm) : +1.25D • MEM : +1.00D(Accommodative lag) • Accommodative facility : (-)Diopter fail (+)Diopter Slow	• OD : S -1.75D C -0.50D 180 VA 20/20 • OS : S -1.25D C -0.50D 180 VA 20/20 • Cover test(Distance/near) : 16/24 exo • Base-out vergence(Distance/near) : (-/6/2) / (4/10/2) • Gradient AC/A ratio: 2:1 • NRA(40cm) OU/OD/OS : +2.00D • FCC(40cm) : +0.50D • MEM : +0.50D • Accommodative facility: OU : 10cpm / OD : 12cpm / OS : 12cpm
Case Analysis	• The patient experiences diplopia and suppression depending on their condition. They have convergence insufficiency (CI) and accommodative dysfunction. Their old glasses were prescribed with ADD, which has hindered the development of their accommodative function.	• It was confirmed that reducing accommodative dysfunction alone led to a decrease in ocular deviation.
Management	• OTUS was prescribed for 15 minutes per day, five days a week, with 5 minutes of monocular and 5 minutes of binocular training in each session.	• OTUS training was prescribed for 10–15 minutes per day, five days a week. Additionally, convergence exercises using a tranaglyph were instructed to be performed five days a week.

Clinical Case Study Conducted at OTUS Vision Research Center

Case 3-1 8 years-old, Intermittent Exotropia(IXT), Accommodative lag

	After(3month)	After(6month)
Patient Assessment	• Ocular deviation occurs 2–3 times per day, but when the patient is prompted to focus, the eyes return to proper alignment.	• The patient occasionally finds it more comfortable to maintain diplopia when feeling fatigued. They can adjust their eyes to achieve proper alignment on their own, but it requires effort (1–2 times per day).
Old Glasses	• OD : S -1.75DC -0.50D 180 VA 20/20	• OS : S -1.25DC -0.50D 180 VA 20/20
	After three month	After six month
Examination Results	• OD : S -2.00D C -0.50D 180 VA 20/20 • OS : S -1.50D C -0.50D 180 VA 20/20 • Cover test(Distance/near) : 14/18 exo • Base-out vergence(Distance/near) : (20/45/-) / (34/45/-) • Gradient AC/A ratio: 4:1 • NRA(40cm) OU/OD/OS : +2.00D • FCC(40cm) : +0.50D • MEM : +0.50D • Accommodative facility : OU : 10cpm / OD : 12cpm / OS : 12cpm	• OD : S -2.00D C -0.75D 180 VA 20/20 • OS : S -1.50D C -0.75D 180 VA 20/20 • Cover test(Distance/near) : 12/9 exo • Base-out vergence(Distance/near) : (45/-/-) / (45/-/-) • Gradient AC/A ratio: 4:1 • NRA(40cm) : OU/OD/OS : +2.00D • FCC(40cm) : +0.25D • MEM : +0.25D • Accommodative facility : OU : 13cpm / OD : 14cpm / OS : 14cpm
Case Analysis	• The patient enjoys OTUS training as it can be done while watching YouTube. However, they performed the tranaglyph exercises well only in the early stages of training, but over time, they found it boring and tedious. As a result, the tranaglyph training was often not completed according to the prescribed routine.	
Management	• OTUS training was prescribed for 10–15 minutes per day, five days a week. Additionally, convergence exercises using a tranaglyph were instructed to be performed five days a week, with (+)D glasses prescribed for tranaglyphtraining.	• OTUS Plus binocular training is recommended for 10–15 minutes per day, 3–5 days a week. Other training has been completed. The patient is requested to visit the center if symptoms recur.